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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,424	12/19/2000	Kiyotaka Tsukada	057329-0001	5114

20572 7590 11/21/2001

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EXAMINER

CHU, CHRIS C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 11/21/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center">Office Action Summary</p>	<p>Application No.</p> <p align="center">09/740,424</p>	<p>Applicant(s)</p> <p align="center">TSUKADA ET AL.</p>	
	<p>Examiner</p> <p align="center">Chris C. Chu</p>	<p>Art Unit</p> <p align="center">2815</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 - 9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

On page 2, line 14, of the specification “4” should be --94--.

On page 13, line 23, “the” should be --an--.

On page 14, line 15, “42” should be --42--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1 ~ 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the recitations “the width of the bottom surface” and “the width of the top surface” lack proper antecedent basis.

In claim 2, the recitation “the longitudinal direction” lacks proper antecedent basis.

In claim 4, the recitations “the height of the portion,” “the portion” and “the height of the conductor pattern” lack proper antecedent basis.

In claim 5, “plating” should be --plate--.

In general, claim 7 is wordy and confusing: in claim 7, it can not be determined what the applicant regards as the “a value obtained by dividing one half of a value obtained by subtracting the width of the top surface from the width of the bottom surface by the height of the conductor pattern is in the range of 0.1 to 2.5.”

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 4, 5, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Shingai et al.

Note Fig. 7 of Shingai et al., where he/she shows a printed circuit board comprising: a substrate (2a); a conductor pattern (3) formed on the substrate (see Fig. 7); and a protection film (1a) coating the substrate and the conductor pattern (see Fig. 7), wherein the conductor pattern (3) includes a bottom surface contacting the substrate, a top surface opposite to the bottom surface, and a pair of side surfaces, each of the side surfaces having a lower side surface covered by the protection film and an upper side surface exposed from the protection film, and the width of the bottom surface being greater than the width of the top surface (see Fig. 7).

Regarding claim 4, Shingai et al. discloses the height of the portion coated by the protection film (1a) in the conductor pattern (3) is 50% or greater and less than 100% of the height of the conductor pattern (see Fig. 7).

Regarding claim 5, Shingai et al. discloses the top surface and the upper side surfaces being coated by a plate (3a and see Fig. 7).

Regarding claim 8, the method steps are disclosed by Shingai et al. for the same reasons provided above for the device claim 1.

6. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Kimiya (Publication number: 01238132).

Note Fig. 2 of Kimiya, where he/she shows a printed circuit board comprising: a substrate (36); a conductor pattern (42) formed on the substrate (see Fig. 2); and a protection film (38) coating the substrate and the conductor pattern (see Fig. 2), wherein the conductor pattern (42) includes a bottom surface contacting the substrate, a top surface opposite to the bottom surface, and a pair of side surfaces, each of the side surfaces having a lower side surface covered by the protection film and an upper side surface exposed from the protection film, and the width of the bottom surface being greater than the width of the top surface (see Fig. 2).

Regarding claim 8, the method steps are disclosed by Kimiya for the same reasons provided above for the device claim 1.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1 ~ 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalal et al. in view of Nobuo et al. (Publication number: 08181423).

Note Fig. 6 of Dalal et al., where he/she shows a printed circuit board comprising: a substrate (10); a conductor pattern (20 and 18) formed on the substrate (see Fig. 6); and a protection film (22) coating the substrate and the conductor pattern (see Fig. 6), wherein the conductor pattern (20 and 18) includes a bottom surface contacting the substrate, a top surface opposite to the bottom surface, and a pair of side surfaces, each of the side surfaces having an upper side surface (20) exposed from the protection film, and the width of the bottom surface being greater than the width of the top surface (see Fig. 6) except a lower side surface (18) covered by the protection film. However, Nobuo et al. discloses a lower side surface covered by the protection film (see Fig. 9). Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Dalal et al. by covering a lower side surface by the protection film as taught by Nobuo et al. The ordinary artisan would have been motivated to modify Dalal et al. in the manner described above for at least the purpose of increasing protection for the conductor pattern.

Regarding claim 2, Dalal et al., as modified, discloses the conductor pattern (20 and 18) has a trapezoidal cross-section that is perpendicular to the longitudinal direction of the conductor pattern (see Fig. 6).

Regarding claim 3, the phrase “the pair of side surfaces having concave surfaces” is structurally inherent in Dalal et al. in view of Nobuo et al.

Regarding claim 4, Dalal et al., as modified, discloses the height of the portion coated by the protection film (22) in the conductor pattern (20 and 18) is 50% or greater and less than 100% of the height of the conductor pattern.

Regarding claim 5, Dalal et al., as modified, discloses the top surface and the upper side surfaces being coated by a plate (43 and see Fig. 6).

Regarding claim 6, Dalal et al., as modified, discloses a solder ball (38) contacting the conductor pattern (20 and 18) at the upper side surfaces (see Fig. 6).

Regarding claim 7, Dalal et al., as modified, discloses a value obtained by dividing one half of a value obtained by subtracting the width of the top surface from the width of the bottom surface by the height of the conductor pattern is in the range of 0.1 to 2.5.

Regarding claim 8, the method steps are disclosed by Dalal et al. in view of Nobuo et al. for the same reasons provided above for the device claim 1.

Regarding claim 9, Dalal et al., as modified, discloses a fabrication method further comprising the steps of: plating (43) the exposed upper portion (20) of the conductor pattern (20 and 18); and joining a solder ball (38) to the plated upper portion (20) of the conductor pattern (see Fig. 6).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wise et al. and Shimizu et al. disclose interconnectors on the substrate.

Art Unit: 2815

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu
Examiner
Art Unit 2815

c.c.
November 9, 2001



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